Calculus Warm Up #7-5

$$f(x + \Delta x) \approx f(x) + f'(x)\,dx$$

Use differentials to estimate without a calculator:

1. $\sqrt{9.3}$

2. $\sqrt{25.4}$

Staple up and turn in

Week 7 Classwork:

Warm up

Blue Graph Snipits

HW Questions: p. 218

In Exercises 1–10, find the differential dy of the given function.

1. $y = 3x^2 - 4$

3. $y = 4x^3$

5. $y = \dfrac{x + 1}{2x - 1}$

7. $y = \sqrt{x}$

9. $y = x\sqrt{1 - x^2}$

13. $y = x^2$

In Exercises 11–16, let $x = 2$ and use the given function and value of $\Delta x = dx$ to complete the table.

$dx = \Delta x$	dy	Δy	$\Delta y - dy$	$\dfrac{dy}{\Delta y}$
1.000	4	5	1	0.8
0.500				
0.100				
0.010				
0.001			$\approx .9998$	

$dy = 2x\,dx$

for $x = 2$:

$dy = 4\,dx$

$\Delta y = f(x + \Delta x) - f(x)$

$= (x + \Delta x)^2 - x^2$

$= 2x\,\Delta x + (\Delta x)^2$

for $x = 2$:

$\Delta y = \Delta x(4 + \Delta x)$

19. The measurement of the radius of the end of a log is found to be 14 inches, with a possible error of $\frac{1}{4}$ inch. Use differentials to approximate the possible error in computing the area of the end of the log.

21. The measurement of a side of a square is found to be 15 centimeters.

(a) Approximate the percentage error in computing the area of the square if the possible error in measuring the side is 0.05 centimeters. Δs

(b) Estimate the maximum allowable percentage error in measuring the side if the error in computing the area cannot exceed 2.5%.

$$\frac{dA}{A} = 0.025$$

$$\frac{2s\,ds}{s^2} = 0.025$$

$ds \approx$ propagated error.

Relative error:

$$\frac{ds}{s}$$

23. The radius of a sphere is claimed to be 6 inches, with a possible error of 0.02 inch. Use differentials to approximate the maximum possible error in calculating (a) the volume of the sphere and (b) the surface area of the sphere. (c) What is the relative error in parts (a) and (b)?

$\Delta r = dr$

a) $V = \frac{4}{3}\pi r^3$

$dV = 4\pi r^2 dr$

c) $\frac{dV}{V} = \frac{3\,dr}{r}$

$\frac{dA}{A}$

Classwork: Yellow worksheet

* Refer to your half sheet on Rolle's Theorem and the MVT

* Teams will be mixed up in 20 minutes to exchange ideas.

HW: Chapter 4 review:

p. 226 # 4, 27 - 33 odd, 41

*Bring your past AP Practice worksheets to class on Monday. We will be taking a closer look. (Yellow AP Problem Set #1 and the Salmon AP Practice - Ch. 4)